

mercurial one. The most striking result of the comparison between the two, is the very near coincidence of the elasticity of the aqueous vapour, as deduced from the experiments, with its amount, as determined from calculation, in a range of temperature from 58° to 74° . But a gradually increasing difference was at length perceptible, showing that gaseous matter had by some means insinuated itself into the tube. When this became no longer doubtful, the boiler was opened, and it was found that a portion of the liquid oil had escaped; and that the remainder had become covered with large flakes of a mucilaginous substance, by means of which it is probable that a communication had been established between the air and the water. The water had, however, retained its purity, and no indication was afforded of the metal having been anywhere acted upon. The author recommends that if these researches are prosecuted, the water should be covered with a stratum of oil of four or five inches in depth, which he has reason to think will form an effectual barrier to all atmospheric influence.

11. "Hourly Observations on the Barometer, with experimental investigations into the phenomena of its periodical oscillation," by James Hudson, Assistant Secretary and Librarian to the Royal Society. Communicated by J. W. Lubbock, Esq. M.A. V.P. and Treas. R.S.

Mr. Lubbock having found, from his examination of the meteorological observations made daily at the Royal Society, that they afforded no satisfactory result as to the daily variation of the barometer in consequence of the too great length of the intervals between the times of observation, the author undertook the task of making a series of hourly observations for a period sufficiently extensive to furnish preliminary data for explaining the anomalies of the barometrical oscillations. The present paper contains these hourly observations, amounting to about 3000 in number, and made in the months of April, May, June, and July, 1831, and in those of January and February of 1832. The standard barometer of the Society has been observed for about 16 or 18 hours during the day, through a period of 75 days; and also at every hour, through the whole twenty-four hours, for 30 days: the water barometer every hour, day and night, for 15 days; and the mountain barometer also every hour, day and night, for the same period. The relative levels of the surfaces of the fluids in the cisterns of each of these barometers, were accurately determined by Mr. Bevan. The most striking results afforded by these observations are exhibited by means of linear representations in four drawings which accompany the paper. The respective variations from each general mean, being referred, according to a given scale, to the mean line, and their points of distance from it, at each successive hour, being connected together by straight lines, the barometrical and thermometrical changes being each referred to the same scale, exhibits the striking connexion that exists between them. The comparison of the simultaneous movements of the three barometers shows the general accordance of their mean variations; and the precession in time, by about an hour, of the mean motions of the water barometer over those of the stand-

ard barometer ; and also the precession, by the same interval, of the mean changes of this latter instrument over those of the mountain barometer. The author concludes by announcing many objects he has in view in the investigations in which he is at present engaged.

12. "Note on the Tides in the Port of London," by J. W. Lubbock, Esq. V.P. and Treas. R.S.

The author gives a comparative view of the predicted times of high water deduced from Mr. Bulpit's tables, White's Ephemeris, and the British Almanac, with the observations at the London Docks, from data furnished to him by Mr. Stratford ; and also a comparison, by Mr. Deacon, at the London and St. Katherine's Docks.

13. "Researches in Physical Astronomy," by the same.

In this Paper a method is given of developing the disturbing function, in which the coefficients of the inequalities corresponding to any given order, are expressed in terms of the coefficients of the inferior orders ; so that, for example, the coefficients of the terms in the disturbing function, multiplied by the squares of the eccentricities, are given analytically by means of the coefficients of those independent of the eccentricities, and of those multiplied by their first powers. As the theorems, to which this method gives rise, are of great simplicity, the author considers them as deserving attention.

The Society then adjourned over the Long Vacation, to the 15th of November.